Ensiling crop residues in bag silos for small ruminant production in Northern Ghana: On-farm training experiences with local farmers

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Key research activities

- About 130 farmers in 9 Africa RISING communities in the Northern, Upper East and Upper West regions of Ghana were trained on innovative methods of ensiling groundnut haulms. Trainings were conducted in the form of on-farm demonstrations and included about 9 women in each community.

Results and main findings

- The only method of crop residues preservation previously known & practiced by farmers in Northern Ghana was drying. This method is associated with greater leaf & nutrient losses (Fig. 1 & 2) & does not allow farmers to conserve wet crop residues in the rain season.
- Farmers' understanding of the biochemistry of conserving wet crop residues by ensiling was made easier by making analogies to preserving food by fermentation, e.g. fermentation of corn dough renders it acidic & thereby preserve it; so is silage.
- Ensiling reduced leaf losses & nutrient leaching caused by unexpected early or late rainfall (Fig. 3-6). It made it possible for farmers to conserve wet crop residues generated in the rainy season.
- A total of about 130 farmers including 9 women were taken through demonstrations on methods of conserving wet crop residues such as groundnut.

Implications of the research for generating development outcomes

- The technology is quite simple & easily adaptable; some farmers were already practicing without any technical supervision.
- Moisture enhances deterioration of crop residues during drying & storage. All crop residues whose storage is constrained by moisture (57 -70%) can be ensiled.
- Silage is a quality feed for fattening small ruminants during the dry season. There is also a vibrant market for crop residues in Northern Ghana. Surplus silages could be sold for income. Small ruminants represent a significant cash reserve & the fattening & sale of small ruminants provides income that is very useful in alleviating food insecurity in Northern Ghana.

How this work would continue in Africa RISING phase 2

Observations from the current study (phase I) indicated lower preference & intake of fresh groundnut haulm (Fig. 6). However intake & growth performance of sheep fed dried or ensiled haulms has not been tested hence the need for the proposed growth performance study in phase II.

Fig. 1: Drying & storage groundnut haulms: farmer practice

Fig. 2: Leaf losses associated drying & storage groundnut haulms: farmer practice Note: Leaves contain more nutrients than stems

Fig. 3: Harvesting the nuts & chopping the haulms for ensiling: innovation introduced by Africa RISING

Fig. 4: Rubber-lined silo bags for ensiling chopped groundnut haulms: innovation introduced by Africa RISING

Fig. 5: Rubber-lined silo bags for storing chopped groundnut haulms: innovation introduced by Africa RISING

Fig. 6: Lower intake of fresh haulms. Intake of ensiled *vs* dry haulms has not been tested: phase II

Current partnerships and future engagements for out scaling

- Small ruminant farmers and urban livestock traders associations.
- Groundnut farmers.
- Traders in crop residues within the 3 Northern regions.

The Africa Research In Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative.

Through action research & development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger & poverty through sustainably intensified farming systems that improve food, nutrition, & income security, particularly for women & children, & conserve or enhance the natural resource base.

The three projects are led by the International Institute of Tropical Agriculture (in West Africa & East & Southern Africa) & the International Livestock Research Institute (in the Ethiopian Highl&s). The International Food Policy Research Institute leads an associated project on monitoring, evaluation & impact assessment.

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